

***EUREKA FIRE WEATHER
ANNUAL REPORT 2009
For
NORTHWEST CALIFORNIA***



Backbone Fire near Willow Creek, CA

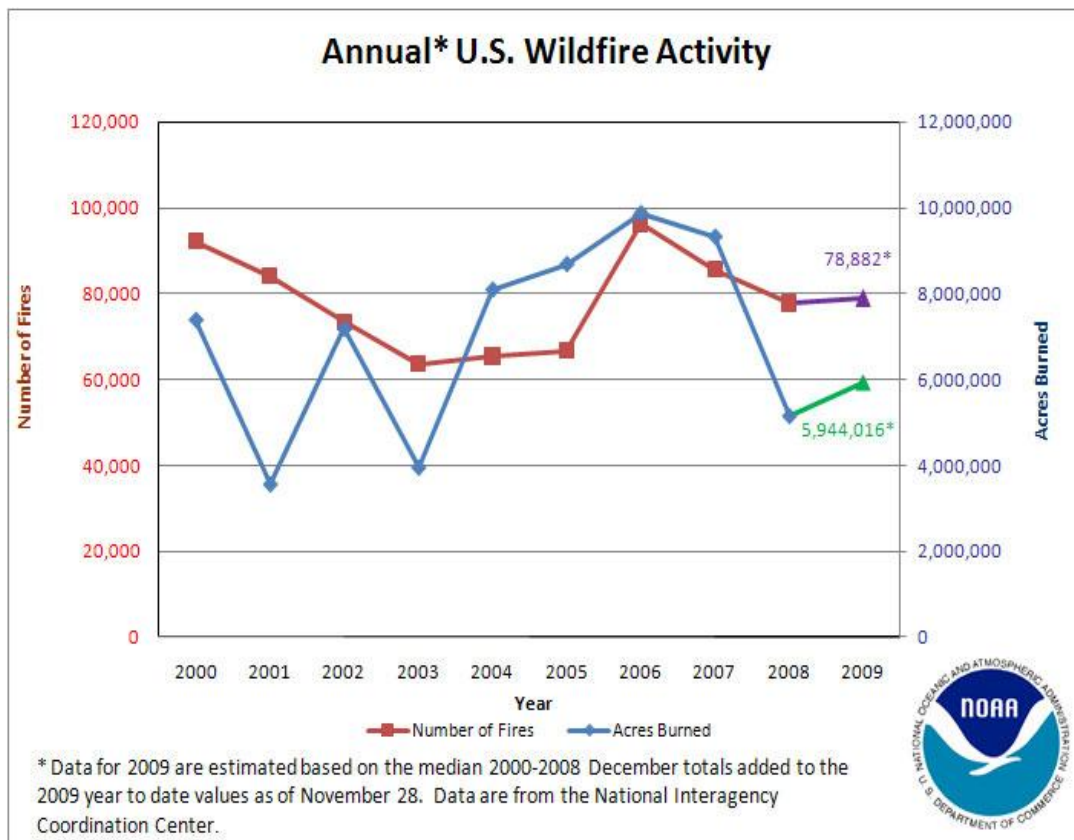
July 5, 2009

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I. INCIDENT REVIEW

National Fire Activity

The 2009 fire season started strong nationally but wetter conditions prevailed through early spring across many parts of the nation and extended into the summer. Despite the wetter conditions the total number of fires remained slightly above the last 10 year average through the end of the year. The calendar year 2009 will rank fifth highest out of the past decade in terms of number of fires; while total acres burned in 2009 will likely fall about 15 percent below the 2000-2008 average.



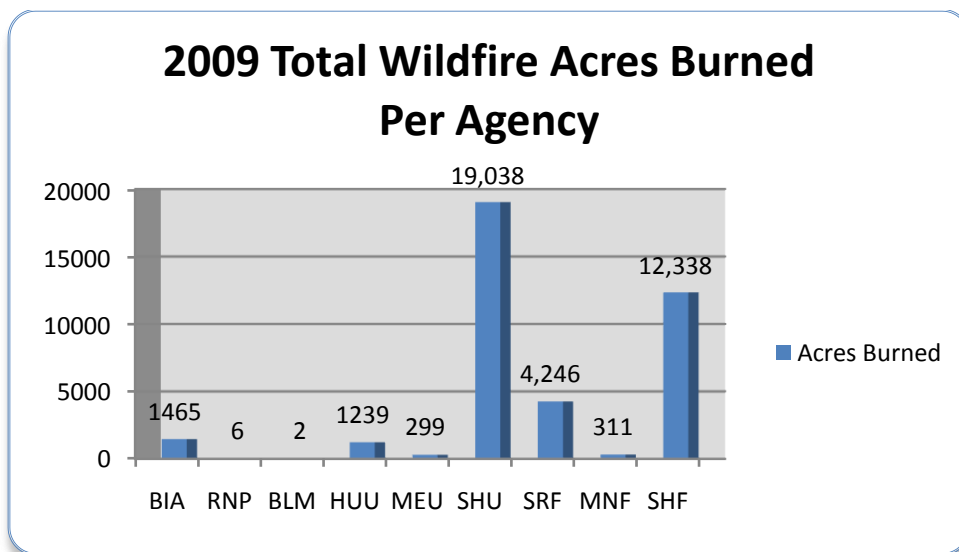
The largest fire of the season was the Station Fire located in Los Angeles County which began on August 26th burning a total of 161,000 acres. This fire was particularly destructive claiming the lives of two fire fighters, 12000 structures including the historic Mount Wilson observatory.

Regional Fire Activity

Northern California fire activity was light compared to the last few years with only three fires exceeding 10,000 acres burned. The SHU fire near Burney reported 17,623 acres burned. Just south down highway 89 the Hat Creek Fire in Lassen National Forest engulfed a total of 11,000 acres. Farther south near Altamont Pass the Corral Fire burned nearly 13,000 acres.

Locally and within the National Weather Service Eureka Office area of responsibility, there were three fires that required incident management team support. The first was the Backbone Complex, which originally encompassed 7 small fires, bordering Humboldt and Trinity counties. These fires were ignited by lightning associated with moist monsoonal flow that moved southeast to northwest across the Hyampom area. Although these storms were accompanied by light rainfall the strikes occurred in areas that were very difficult for initial attack to access. In early August an additional round of moisture fed thunderstorm development along the eastern Shasta Trinity NF igniting many small fires. One fire near Weaverville grew into what was later named the Coffin Fire and was finally extinguished after burning around 1,200 acres. In early October the Mill Creek Fire burned nearly 3000 acres near Hoopa and is considered an arson fire.

<u>Incident</u>	<u>Agency</u>	<u>County(s)</u>	<u>Acres</u>	<u>Dates</u>
Backbone Complex	SRF	Humboldt/Trinity	6,324	July 2 - Aug 8
Panther Fire	HUU	Humboldt	12	July 17-18
Sheppard Fire	MEU	Mendocino	102	July 20-21
Coffin Fire	SHU / SHF	Trinity	1,200	Aug 12-17
Iaqua Fire	HUU	Humboldt	170	Oct 3-4
Mill Creek	Hoopa BIA / SRF	Humboldt	3,000	Oct 7-17
Total				



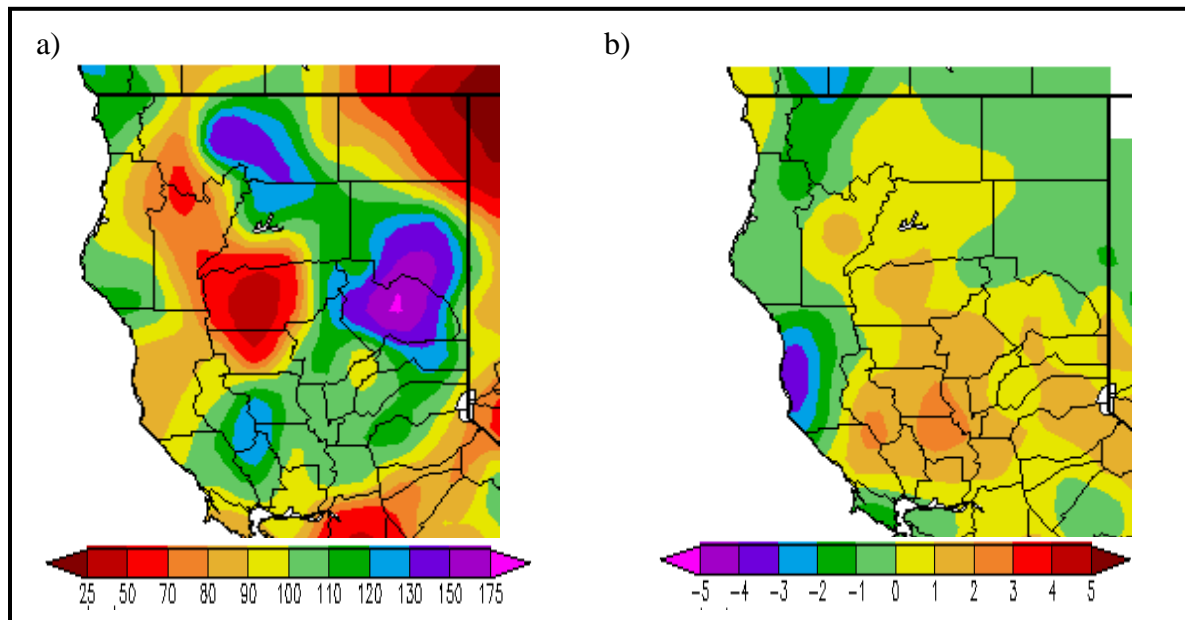
The graph above illustrates the total acres burned by wildfires during 2008 delineated by agency responsibility. Some direct protection areas such as MNF and SHU overlap into the Sacramento CWA, thus not all of the acres shown above were solely within the Eureka CWA.

II. WEATHER REVIEW

Winter / Early Spring 2009 (Jan – Mar)

A very dry fall and early winter of 2008 plagued northwest California. The rain producing winter storms finally arrived in December but despite near normal precipitation for the month precipitation ranked well below normal for the region. January 2009 saw some winter storms but still fell below normal for the month which continued the drying trend for the rain year. As of January 30th 2009 the region was 60 to 70 percent of normal, and more specifically WFO Eureka was 8.10 inches below normal for the year...the third driest January on record for Eureka. The lack of clouds and precipitation coincided with below normal temperatures for the month as well as dominant high pressure prohibited the warmer southerly flow from reaching the area. The storm track finally shifted south over northern California during the first week of February. The storms were generally cold and did supply plenty of rain and snow to the region. Nearly 3 weeks out of the month reported precipitation which was spread uniformly across the CWA. The wet month cut the precipitation deficit nearly in half. March was also a cool and with higher than normal precipitation for the first half of the month. The latter half of the month was drier with less cloud cover promoting several minimum temperature records broken around Humboldt Bay. Precipitation was around normal for March which did not help the deficit much and by April 1st the most of the northwest California was running 50 to 80% below normal. The coastal regions fared a little better as shown in the images below.

Fig. 2.1



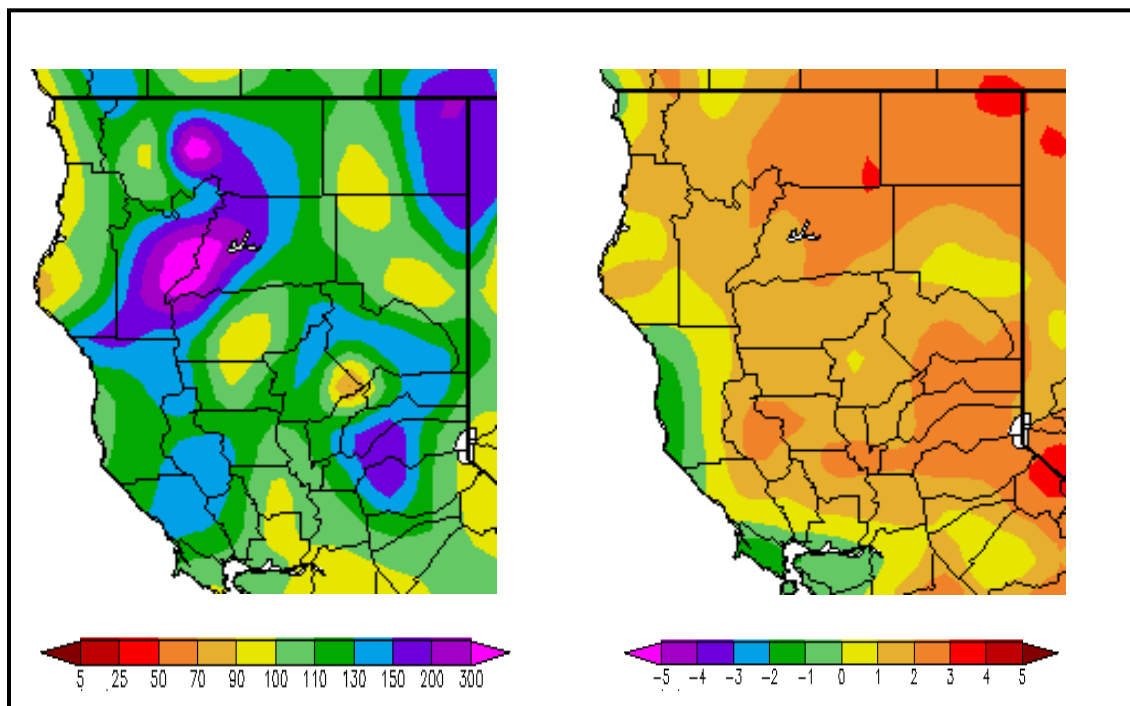
(a) Average precipitation departure in percent for the period Jan 1, 2009 through Mar 30, 2009.

(b) Average temperature departure in degrees F for the period Jan 1, 2009 through Mar 30, 2009.

Late Spring / Early Summer 2009 (Apr – June)

The dry pattern continued into April with very little storm activity and plenty of clear days and nights. The absence of cloud cover gave rise to cold and crisp nights and mornings across the EKA CWA resulting in cooler than normal temperatures for the month. The dry pattern finally broke in May as the storm track fell south and was directed into northern California through much of the month. Pacific storms brought rain and high elevation snow to northwest California through the first two weeks of May. High pressure returned for the 2nd half of the month. Despite the plentiful rainfall during the first half of May precipitation was roughly an inch above normal along the coastal regions while the interior areas were closer to normal. Temperatures ended slightly below normal for the month. June became an interesting month in terms of weather as it was the first month in 2009 to record above normal temperatures. Fig 2.2 also shows a peculiar pattern in the precipitation graphic. Coastal regions of northwest California actually were near or below normal in terms of precipitation while the interior was nearly 100% higher than normal. This was due to a strong monsoonal push of moisture early in June. The abundant moisture would combine with an upper level low pressure system which triggered strong and severe thunderstorm activity across the Interior zones. These storms produced heavy rainfall, large hail, and very strong winds warranting the issuance of several severe weather warnings and flash flood warnings across eastern Humboldt and Trinity Counties. The storms occurred during the first few days in June but shower activity continued through June 10 adding additional rainfall to the interior region while the coastal zones remained drier than normal. High pressure returned the latter half of the month promoting more seasonable conditions through the remainder of the month.

Fig. 2.2



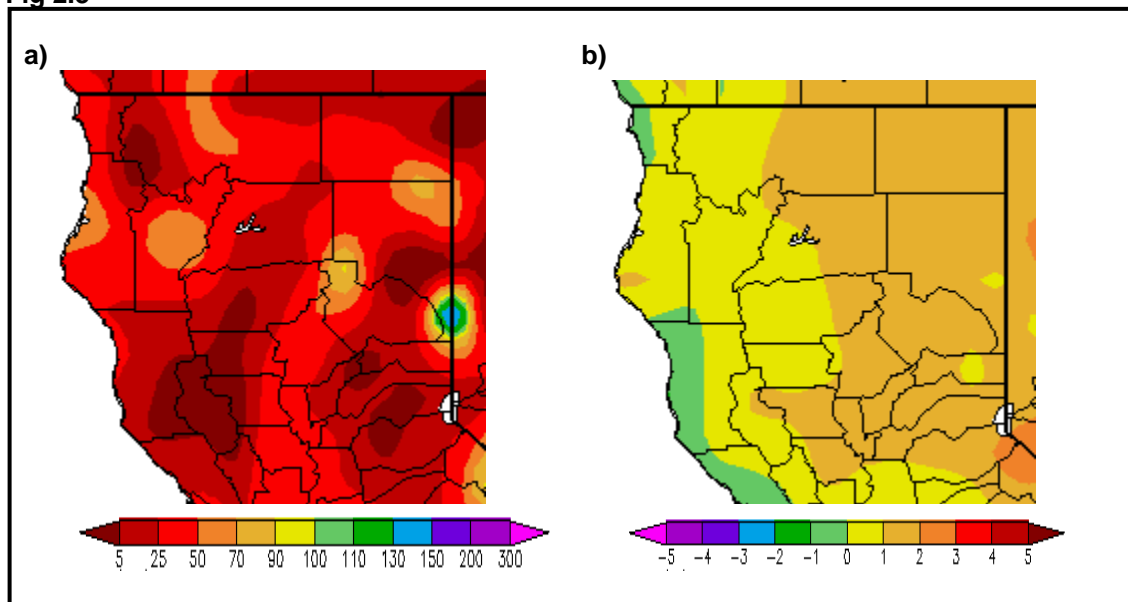
(a) Average precipitation departure in percent for the period Apr 1, 2009 through June 30, 2009.

(b) Average temperature departure in degrees F for the period Apr 1, 2009 through June 30, 2009.

Late Summer / Early Fall 2009 (July – Sep)

Northwest California's fire season typically occurs during this three month period and 2009 proved to be no different. Despite the late spring rains in May and early June fuels dried out rapidly and by July were receptive to lighting. A band of thunderstorms ignited several small fires around the Willow Creek area during the last few days in June. There was no rainfall and very few marine pushes...thus fuels continued to dry. August was another exceptionally dry month for the EKA CWA except for a few thunderstorms that dropped very small amounts of rain across eastern Trinity County during the middle of August. Toward the middle of September a monsoonal push of moisture moved north across the central valley and into northwest California. Fire Weather Watches and eventual Red Flag Warnings were issued for dry lightning however very little strikes were recorded within the CWA for this event. The dry pattern continued into September until an early fall Pacific storm finally brought about an inch of rain to the coastal regions...but only about 0.25 to 0.33 of an inch reached the interior areas. The remainder of September saw mainly dry conditions. Offshore events were weak during the three month period. One event occurred during the 3rd week of September and spawned the issuance of several Red Flag Warnings. Fig 2.3 depicts the very dry conditions across the northern half of the state during this period. Temperatures during this period were near normal.

Fig 2.3



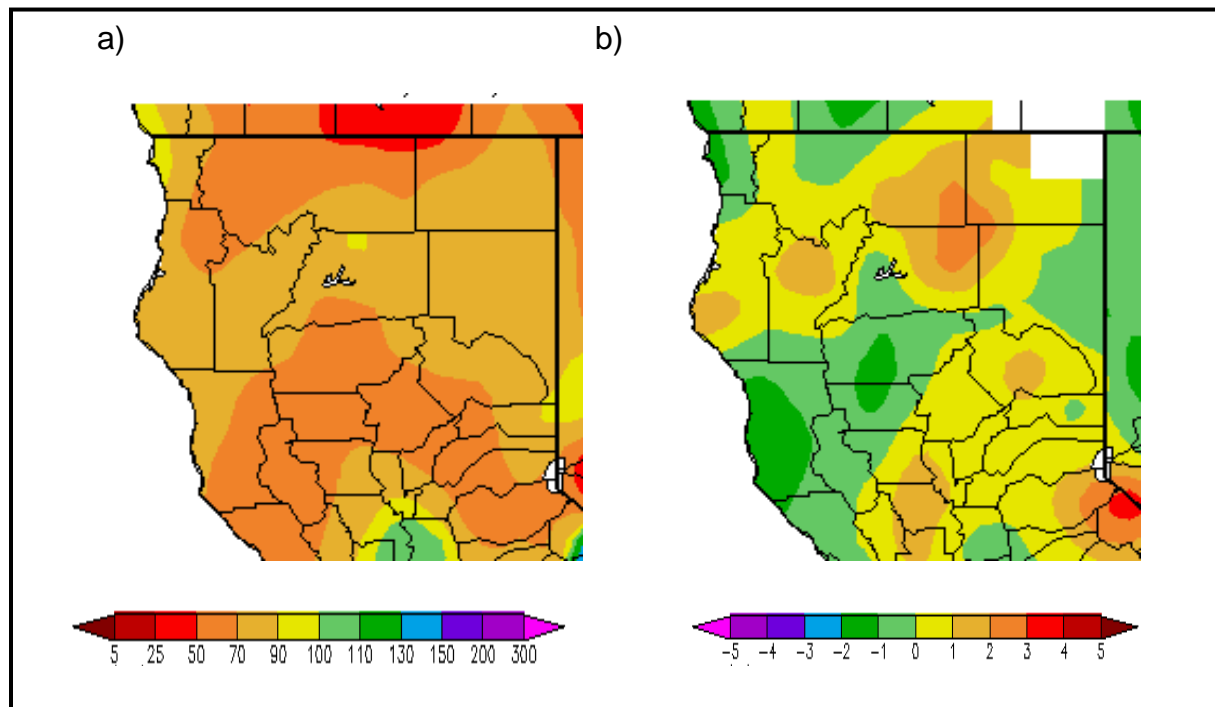
(a) Average precipitation departure in percent for the period Jul 1, 2009 through Sep 30, 2009.

(b) Average temperature departure in degrees F for the period Jul 1, 2009 through Sep 30, 2009.

Late Fall / Early Winter 2009 (Oct – Dec)

Weak offshore flow during the first week of October helped sustain the Mill Creek Fire north of Hoopa Valley. The fire was eventually extinguished by the first winter storm of the season which occurred on October 17th. This storm brought over an inch of rainfall to the coast and coastal interior zones. The mid October storm was followed by a period of high pressure and traditional fall like conditions with warm temperatures and clear skies. By late October the storm track returned and another round of rainfall blanketed northwest California. Despite the storms October ended nearly normal for precipitation and temperature. A much drier pattern returned in November that saw extended periods of high pressure. The high pressure also contributed to clear skies which produced cold nights and mornings across the region. Thus November ended drier and colder than normal. The dry pattern continued well into December until the middle of the month when the jet stream finally sagged south allowing a potent rainfall producing storm to reach the area. This storm brought over an inch of rainfall to elevations below 3000 feet while snow fell above this level. Another strong storm pummeled the coast during the third week in December with plentiful rainfall focused over Del Norte and northern Humboldt counties. Despite the wet storms, December still ended nearly 2 inches below normal for precipitation. The three month period showed significantly drier than normal conditions while temperatures were near or slightly below normal...as depicted in the images below.

Fig. 2.4



(a) Average temperature departure in degrees F for the period Oct 1, 2009 through Dec 31, 2009.

(b) Average precipitation departure in percent for the period Oct 1, 2009 through Dec 31, 2009.

III. RED FLAG WARNING VERIFICATION

Eureka Fire Weather issued 13 individual zone Red Flag Warnings during the 2009 fire season. Of the 13 warnings 8 were for Dry Lightning and 5 were for Wind and RH. Four of the warnings for Dry Lightning warnings were preceded by a watch. There were no events that were considered missed.

- Correct Warnings (Verified) = 0
 - Incorrect Warnings (not verified) = 13
 - Missed Events = 0
- POD = Probability of Detection
 FAR = False Alarm Ratio
 CSI = Critical Success Index

2009 EKA Verification Summary				
	<u>POD</u>	<u>FAR</u>	<u>CSI</u>	<u>LEAD TIME (HOURS)</u>
EKA Wind/Rh	0.00	1.00	0.00	N/A
Regional Goal	0.93	0.24	0.70	11.5
EKA Dry Lightning	0.00	1.00	0.00	N/A
Regional Goal	0.74	0.50	0.53	7.0
EKA Combined	0.00	1.00	0.00	N/A
Regional Goal	0.85	0.37	0.64	10.0
Highest Possible Accuracy	1.00	0.00	1.00	

2009 WARNING VERIFICATION BY ZONE								
ZONE	# RFW	Correct RFW	Incorrect RFW	Missed Event	POD	FAR	CSI	# Watch
201	0.0	0.0	0.0	0.0				0.0
202	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
203	2.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0
204	2.0	0.0	2.0	0.0	0.0	1.0	0.0	1.0
211	2.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0
212	2.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0
276	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0
277	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0
283	2.0	0.0	2.0	0.0	0.0	1.0	0.0	1.0
TOTALS	13.0	0.0	13.0	0.0	0.0	1.0	0	4.0

IV. NFDRS FORECAST VERIFICATION

Verification was performed by comparing forecasted values for each zone, then compared against the zone averaged observation at 1300 PDT the following day. The absolute mean difference is then compared to persistence. Persistence is defined as the absolute mean difference between the observation at 1300 PDT the day the forecast was issued and the observation at 1300 PDT the following day. Each zone is comprised of several RAWS observations that are used to calculate the zone averaged values. The zones and RAWS locations are depicted in the map below.

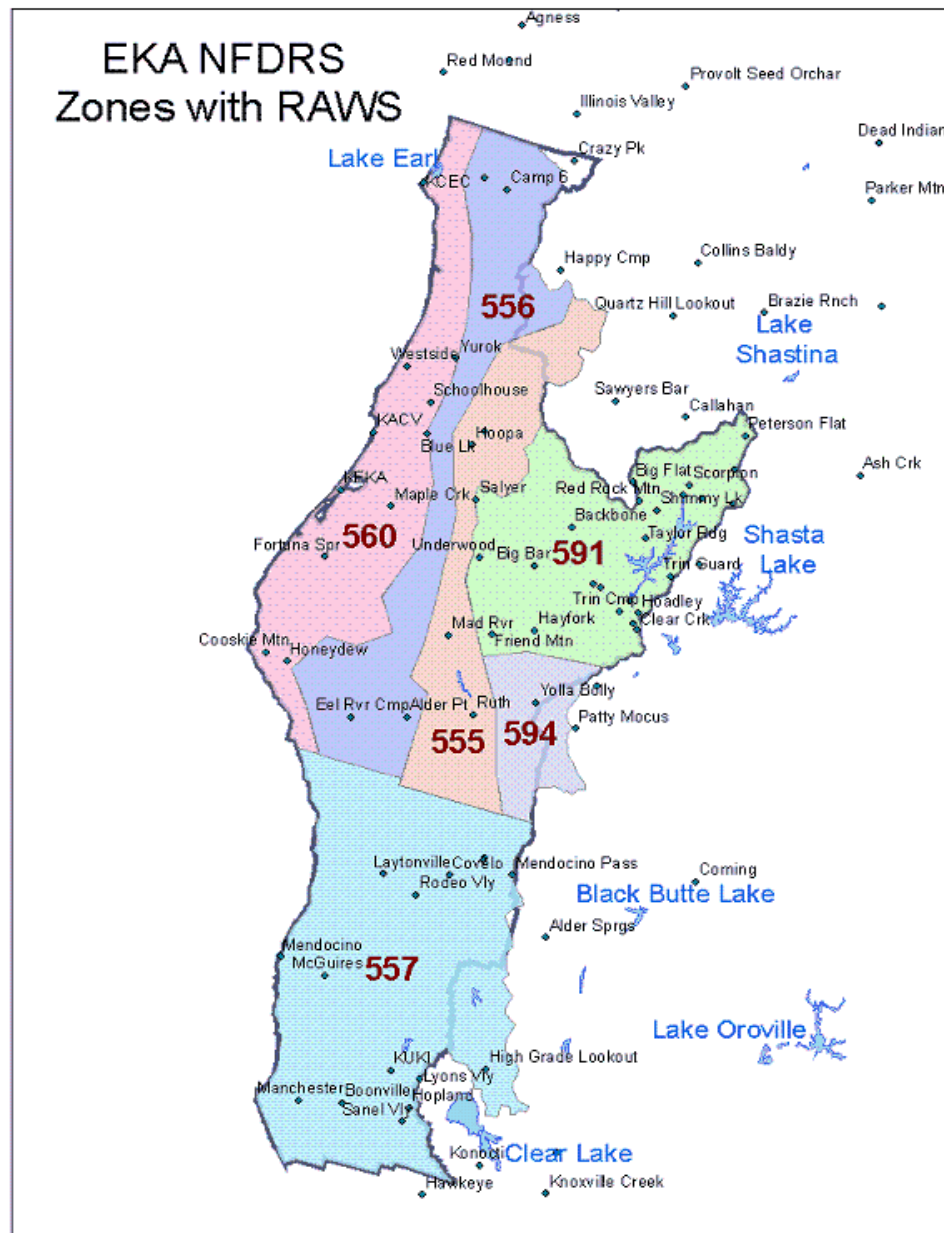
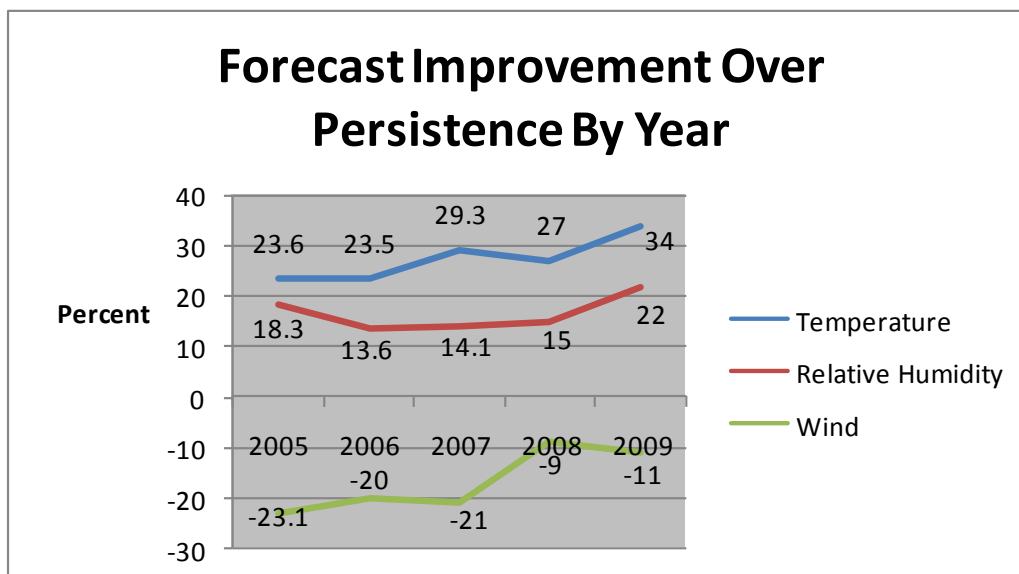
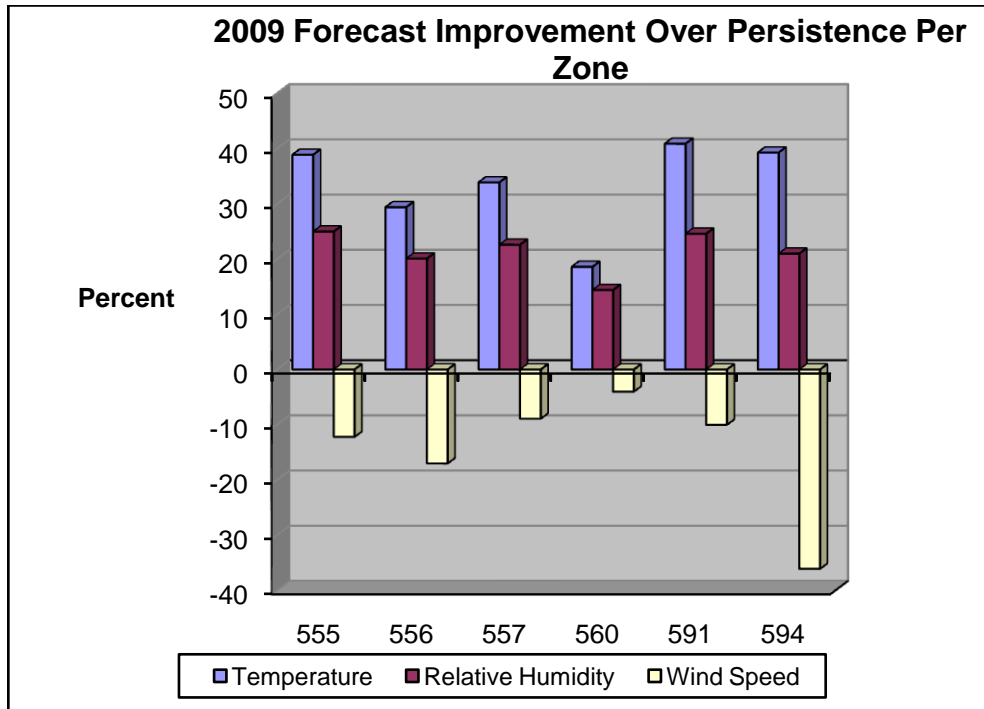


Fig. 4.2 shows that an improvement in temperature forecasts over persistence ranged from 20-40% for all zones last summer, while relative humidity forecasts showed a general improvement of 15 to 25% over persistence.

This translates to roughly a 10 to 15 percent improvement for all zones in terms of both temperature and rh from last year. Wind speed forecasts continue to be poor compare to persistence, while 2009 showed a subtle degradation compared to 2008. The interior zones, specifically Zone 594, continue to show a strong negative bias and it is unknown at this time whether forecasts are generally too high or too low compared to persistence.

Fig. 4.2



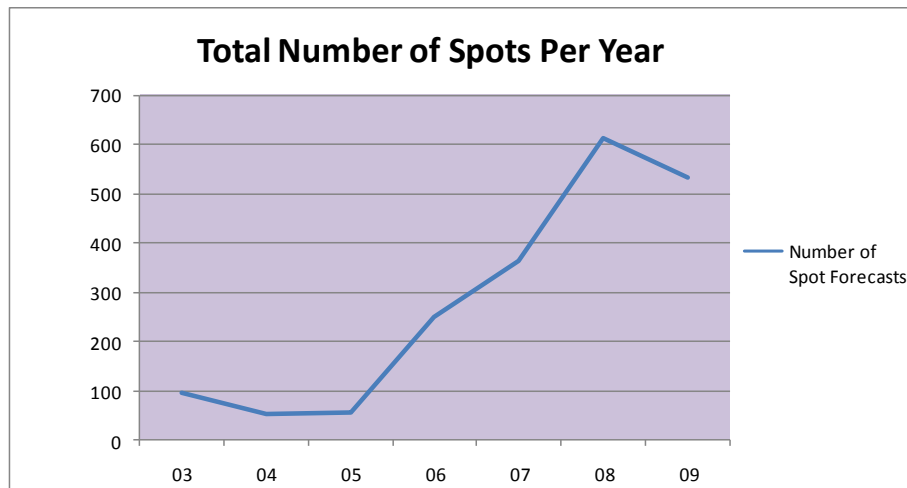
V. SPOT FORECASTS

The National Weather Service Office in Eureka issued a total of 532 site specific or spot forecasts during the calendar year 2009. This presents a decrease of 80 spot forecasts from last year or about a 13% reduction. Although the amount of spot forecasts issued by WFO Eureka did not increase during 2009 compared to 2008, the 532 issued supports a continued trend of increasing spot forecast requests when compared to the 2003-2008 average. The 2009 year end spot request statistics point to a dramatic increase in prescription burn requests...while the number of requests associated with wildfire dropped significantly. The drop in wildfire requests was not surprising considering wildfire activity within the CWA was vastly lower than 2008. .

Table 5.1

Spots for Wildfires	82
Spots for Project Burns	450
Spots for Hazmat	0
Misc. / Training Spots	0
Average Turnaround Time	
For All Spots	29 minutes
Total Spots	532

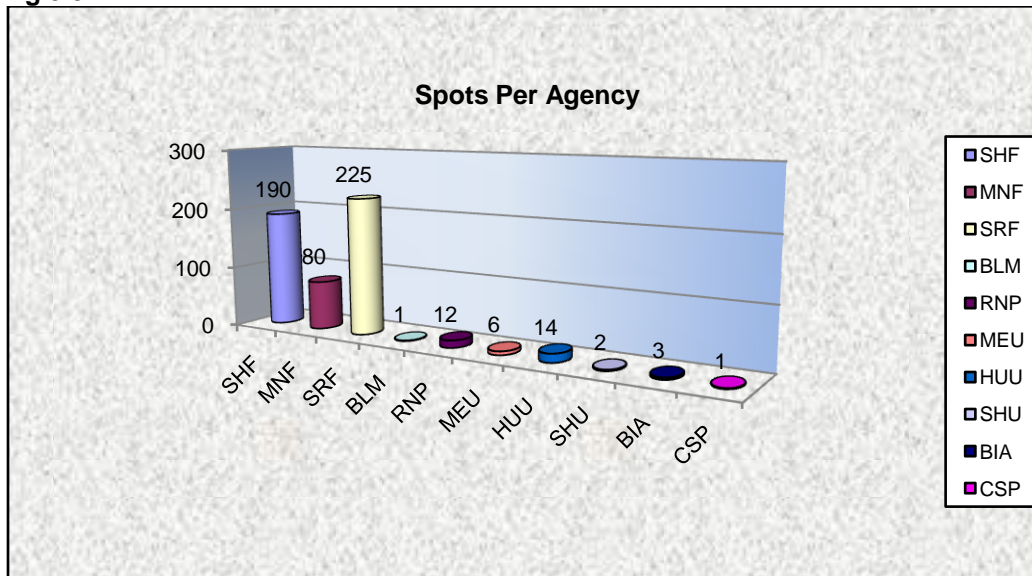
Fig 5.2



Nationally, WFO Eureka ranked 5th out of 122 NWS offices with regard to the issuance of spot forecasts associated with prescription burn requests. In terms of overall spot forecasts issued WFO Eureka ranked 10th overall for 2009. The average “turn-around-time” for all spot forecasts was 29 minutes. The turn-around time showed a decrease of 2 minutes from 2008. Turn-around time is defined as the elapsed time between a spot forecast request receipt (and notification) and forecast transmission.

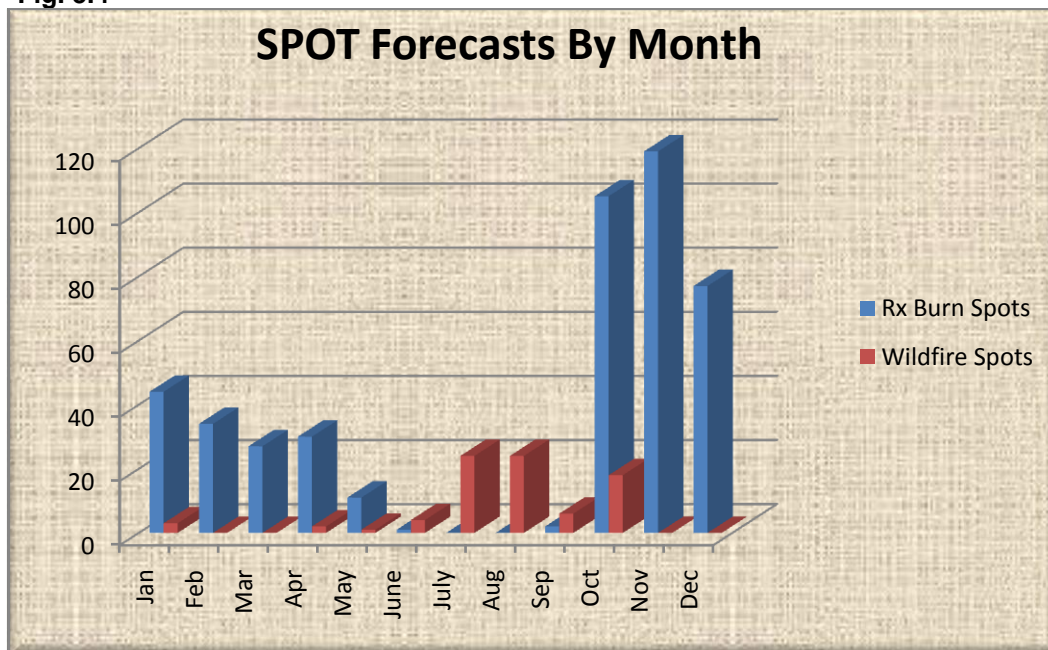
Most prescription spot forecast requests were for small burns or pile burns initiated by the Forest Service. Similar to previous years, the majority of spot forecast requests came from the USFS and CAL Fire with less than 5% distributed between the national and state parks and BIA and BLM.

Fig 5.3



Given that 85% of all spot forecasts issued were for Rx burns it is interesting that both the SHF and SRF were generally similar in the amount of requests during 2009. This indicates a significant increase in Rx requests from SHF... as in the past most requests were only associated with wildfire. It is also interesting to note that nearly a 25% increase in spot requests was observed from MNF compared to 2008.

Fig. 5.4



VI. ON-SITE METEOROLOGICAL SUPPORT

Incident Meteorologist (IMET) support from WFO Eureka totaled 31 days. Eureka currently has two certified IMET's, Jeff Tonkin and Mark Burger. IMET Jeff Tonkin was dispatched to 3 separate incidents. (Fig. 7.1). There were no IMETs from other National Weather Service WFO's dispatched to fires within the Eureka CWA during 2009.

Table 6.1

<u>IMET</u>	<u>Incident Name</u>	<u>Location</u>	<u>Dates</u>	<u>Local WFO</u>
Jeff Tonkin	Backbone Complex	Willow Creek, CA	Jul 6 - Jul 20	EKA
Jeff Tonkin	SHU Complex	Burney, CA	Aug 4 - Aug 18	STO
Jeff Tonkin	Mill Creek Fire	Hoopa, CA	Oct 11 - Oct 13	EKA

VII. TRAINING, EDUCATIONAL, OUTREACH AND FIELD ACTIVITIES

The following table summarizes various fire weather activities the Eureka fire weather staff participated in during the 2009 calendar year.

<u>Dates</u>	<u>Activity</u>	<u>Agency/User/Audience</u>	<u>Representative</u>	<u>Location</u>
Jan 12-13	Taught S-390	CALFIRE	Mark	North Bay
Feb 17	Fire Weather Conf Call	NWS - WR	Nancy, Jeff	Eureka, CA
Feb 18	EKA '08 Review	NWS	Jeff	Eureka, CA
Mar 3-4	CAAOP Meeting	Multiple Agency	Jeff	Irvine, CA
Mar 16-20	IMET Workshop	NWS	Jeff	Boise, ID
Mar 25	User Meeting	MNF	Jeff	Willows, CA
Mar 25	User Meeting	SHF	Jeff	Redding, CA
Apr 1	Familiarization Trip	Redding GACC	EKA Staff	Redding, CA
Apr 6-10	Attended S-290	EKA	Brian Koeneke	Santa Rosa, CA
Apr 21-22	User Meeting	Howards Forest / MNF	Mark	Mendocino County
Apr 28	User Meeting	Hoopa BIA / SRF	Mark	Willow Creek, CA
Apr 30	User Meeting	Multiple Agency	Nancy, Jeff, Brian	Eureka, CA
May 4	Begin Fire Season	EKA	Staff	Eureka, CA
June 25	User Meeting	Redwood NP	Jeff	Orick, CA
July 6-20	IMET Dispatch	Backbone Complex	Jeff	Willow Creek, CA
July 12-13	Familiarization Trip	Backbone Complex	Matt	Willow Creek, CA
Aug 4 - 18	IMET Dispatch	SHU Complex	Jeff	Burney, CA
Oct 11-13	IMET Dispatch	Mill Creek Fire	Jeff	Hoopa, CA
Oct 25	End Fire Season	EKA	EKA Staff	Eureka, CA

VIII. EUREKA FIRE WEATHER PROGRAM SUMMARY

The following table illustrates a comparison of activity and performance for the period 2003 through 2009.

ANNUAL COMPARISON TABLE										
	2003	2004	2005	2006	2007	2008	2009	'03-'09 Total	'03-'09 Ave.	07-'09 Ave.
Red Flag Warnings Issued:	14	5	3	16	2	32	13	85	12.1	15.6
Dry Lightning:	1	0	0	3	2	19	8	33	4.7	9.6
Wind/RH	13	5	3	13	0	13	5	52	7.4	6
Average Lead Time (hr)	13	16.1	9	13.6	0	17	N/A	58.7	8.5	9.78
Fire Wx Watch	5	4	4	10	2	36	4	65	14	10.2
Dry Lightning:	4	0	0	0	2	19	4	29	8.3	4.2
Wind/RH	1	4	4	10	0	17	0	36	5.7	6
Average Lead Time (hr):	16	33.5	14.5	29.5	0	59.5	N/A	153	25.5	30.6
POD	1.0	1.0	1.0	1.0	0.0	1.0	0.0	5.0	0.71	0.33
CSI	0.71	1.0	1.0	0.86	0.0	0.63	0.0	4.20	0.60	0.21
FAR	0.29	0.0	0.0	0.14	1.0	0.38	1.0	3.42	0.49	0.93
Spots Issued	95	53	56	250	363	612	532	1961	280	502
Wildfire Spots	85	17	14	91	57	316	82	662	95	151
Rx Spots	10	34	39	158	306	296	450	1293	185	351
Turn-Around Time (min.)	70	56	37	52	35	31	29	310	44	32
Total EKA IMET Days	33	28	23	106	63	48	31	332	47	37
Mark				53	28	14	0	95	24	11
Jeff	33	28	23	53	35	34	31	237	34	33
Total IMET Days in CWA	11	6	0	127	7	317	17	485	70	114

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